Economics of the use of Biological Control Compared to Conventional Resistance of Insect Pests on Some Economic Crops

Economics of Using Biological Versus Traditional Methods for Controlling Insect Pests Infesting Some Economic Crops Summary and conclusion :The thesis includes six major chapters, besides introduction, research problem, research method, information sources and the outline. Chapter one covered the reference review of previous research efforts on insect pests control. The second chapter dealt with various methods of agricultural pests control. In the third chapter, world cotton indicators and cotton production and economic limiting factors in Egypt were covered. World economic indicators of potato production and economic limiting factors of its production in Egypt were investigated in chapter four. The uses of insecticides in cotton and potato in Egypt were dealt with in the fifth chapter. At last, chapter six covered insecticides marketing routes.In general, the research aimed at investigating economics of using biological control, compared to chemical control in combating insect pests infesting some economic crops. And in particular, the research work attempts to explore the economic impacts of biological pest control in cotton and potato in Egypt, and also various consequences of biological control on human, plant and the surrounding environment. The study used descriptive and quantitative approaches to analyses statisticaldata.It was revealed that Egypt supplies the world market with some of its requirements from long and extra long staple cotton, owing to its high spinning quality. The cotton cultivated area reached around 856,000 feddans during the average period 1996-1998, representing about 12% of the average cultivable area in Egypt during the same period, in which the average productionper feddan reached 7.09 Kantars .Egypt also is accounted as one of the potato producing and exporting countries. As Egyptian potatoes could be produced and exported to Europe at times of scarcity of newly-harvested potatoes. The average potato cultivated area in Egypt reached around 239,100 feddans during the z.verage period 1996-1998, with an average production of 9.34 tons per feddan at the sameperiod .The thesis indicated that biological control leads to the reduction of pests populations through the use of predators, parasites and pathogenic agents. The reduction of pests reached to levels less than critical economic points of infestation. The use of chemicals has been stopped in newly cultivated areas such as East Owaynat, Toshka, and New Valley, with a view to produce clean crops for local consumption and exportation abroad with high values. The study has also revealed that, the use of biological control is better than chemical control, with respect to stored Potatoes and also to cotton leafwoim infesting cotton crop.The study has indicated that the cotton cultivated area in Egypt has been reduced from around 1.08-million feddans in 1985 to about 788.8-thousand feddans in 1998, with a reduction rate of 27%. The unit area (feddan) productivity of cotton has also been reduced from around 8.05 Kantars per feddan in 1985 to about 5.82 Kantars per feddan in 1998, with a depression rate of 27.7% . Thus, the gross production of cotton has declined from around 8.71-million Kantars in 1985 to around 4.59-million Kantars in 1998, with a depression rate of 47.2% and with an annual moral depression rate of 2.45% .The study has indicated that Dakahlia governorate cultivates the largest area of cotton amongst Egypt’s governorates, as it reached around 116.48-thousand feddans during the mean period 1996-1998, representing 13.6% of the total cultivated area in Egypt, the cultivated area in Kafr El Sheikh

reached around 101.26-thousand feddans representing 11.83%, Sharkia governorate ranked third with a cultivated area2of 93.9-thousand feddans representing 10.97% of the total cultivated area in the country.The study has also indicated that the _rate area (feddan)productivity has declined in most governos from the overall mean, except Assiut governorate, where it reached 8.56 Kantars per feddan with a rise of 21% over the country's general mean of 7.09 Kantars per feddan during the period 1996-1998, also in Sohag governorate, where its productivity reached around 7.88 Kantars per feddan with a rise of 11% .The study has shown that Beheira was the highest cotton producing governorate with a production of around 902.45- thousand Kantars representing 14.75% of total production in Egypt during the mean period 96-1998, at the second rank, Dakahlia governorate comes with a production of around 587.33-thousand Kantars at the rate of 9.6% whereas Minia and Sharkia governorates ranked third and fourth with a production of around 537.8 and 537.02-thousand Kantars, respectively at the rates of 8.79% and 8.78% of total production for the same indicated period.The study revealed that the unit area (feddan) cost of production for cotton in Egypt has increased from L.E. 499.55 in 1985 to around L.E. 1626.1 in 1998,in a rise rate of 225.5% and at an annual statistical moral rate of L.E. 105.06 per feddan. Also the value of a Kantar of cotton has escalated from around L.E. 96.86 in 1985 to L.E. 348.9 in 1998 in an annual rise rate of10.86%.Thesis has also indicated that potato production in Egypthas increased from 1.487-million tons in 1985 to 1.984-million tons in 1998, in a rise rate of 34.21%. The production has taken an ascending course reaching around 81.92-thousand tons, with annual rise rate reached about 4.6%.The cultivated area of potato reached around 177.23-thousand feddans in 1985 and increased to 211.46-thousand feddans in 1998, with a rise rate of 19.31%. The potato cultivated area has escalated at an annual moral statitical rate of 8.64-thousand feddans with a percentage of around 4s.79%.The feddan productivity of potato has increased from around 8.34 tons per feddan in 198:5 to 9.38 tons in 1998 in an increment rate of 12.47% and at an annual increase rate of 1.28%The study has also indicated that the cultivated area of potato in the summer season has in creased from around 81-thousand feddans in 1985 to 132.18-thousand feddans in 1996, with an increment rate of 63%- and shrinked in 1998 to 75.7 -thousand feddans whereas the Potato yield of the unit area has increased in the summer season from 8.66 tons in 1985 to 9.94 tons per feddan in 1998, with an increment rate of 14.8%. The production as well has increased from around 702.39-thousandtons in 1985 to 752.66- thousand tons in 1998, with on increment rate of 7.2%.The potato cultivated area has shrinked in the Nili season from around 96-thousand feddans in 1985 to around 73.47-thousand feddans in 1998, with a reduction rate of 23.6%. In the meantime the feddan productivity of Nili potatoes increased from 8.07 tons in 1985 to 8.23 tons in 1998, with an increase of 2%. The total production of such season reached 775.83-thousand tons in 1985, decreased to 604.42-thousand tons in 1998, viz. At a reduction rate amounting to 22.1% .Due to the non-existence of data about Mohiera season prior to 1990, for being added before to "Summer" season statistics, the study refers that Mohiera Season area estimated around 24.44 - thousand feddans in 1991, already increased to62.24-thousand feddans in 1998, viz. by over 154.06% approximately .As for the feddan productivity of potatoes during Mohiera season, the study refers that the feddan productivity increasedfrom 9.06 tons in 1991 to 10.07 tons in 1998, viz. by over about 11.1% .In the meantime the productior volume of such season reached 626.9-thousand tons in 1998 compared to 221.53 —thousand ton in 1991, viz. by over about 183%.4The study refers that the costs related to Summer potatoes' feddan productivity in Egypt increased from L.E. 822.6 in 1985 to L.E. 3719.1 in 1998. Such costs morally and statistically increased at the rate of L.E. 252.4 per feddanannually.The thesis also shows that the costs relevant Nilipotatoes' feddan productivity escalated from about L.E. 701.23 in 1985 to L.E. 3290.8 in 1998. Such costs morally and statistically increased at the rate of L.E. 215.25 annually.The thesis refers that the farm prices of Summer potatoes increased from L.E. 129/ton in 1985 to L.E. 653/ton in 1998. These prices have, morally and statistically, taken a general ascending direction at the rate of L.E. 53.6/ton annually. The study also indicates that the farm prices of Nile potatoes increased from L.E. 131/ton in 1985 to L.E. 411.7/ton in 1998. These prices have, morally and statistically, taken a general ascending direction at the rate of L.E. 29.63/ton annually.Systemic chemical pesticides have been in use for control of pests since World War 11, and the intensity, quantity and varieties of chemicals have increased

rapidly world-wide with the developed countries leading in quantities utilized, as the world eco-reports pointed out that 2.5-billion kgs of syntheticpesticides used annually world-wide for agriculture, publichealth, and other purposes are particularly damaging toenvironment.. Also, an estimated US $20 billion is spentannually in the world on pesticides, yet, parasites and predatorsexisting in natural ecosystems are providing an estimated 5-10times its amount of pest control .The study refers that the pesticides' quantity-used in controlling the insects, fungi and weeds in the crops cultivated in Egypt — is different from crop to crop and from govenorate to governorate as well as during the different months over the year.In view of the importance of cotton crop in Egypt, the state has been giving a great interest to such crop. This interest is represented in controlling the pests which infect the crop. The pesticides quantity used in controlling the cotton pestshas been reduced from about 5903 tons in 1985 to around 645.8 tons in 1998. It is worthy mentioning that El Beheira Governorate uses the biggest quantity of such pesticides amounting 29.9% from the total quantities used by Egyptian governorates in 1999, Governorates of Kafr El Shekh and ElSharkiya are the following in order at the rates of 15.9%, 12.3% respectively .Considering potatoes crop one of the most important export crops & necessary for domestic consumption, itis very essential to control any pest that could appear under any condition.The thesis refers that an area of approximately 293.1-thousand feddans was treated against infection by blight disease in 1995, which was reduced to 168.8-thousand fed. in 1999. It was also treated an area of 36.2-thousand fed. infestedby potato tubewonn in 1995 which was reduced to 34.3-thousand fed. in 1999.El Behiera Governorate is considered the biggest governorate which succeeded to treat the blights disease in potato, followed by El Menoufia Governorate. El Menoufia Governorate is deemed the biggest governorate that treated potato tubers' worm, followed by El Beheira governorate within1995-1996, but in 1999, El Beheira governorate was the biggest governorate that treated potato tubers' worm .Also the thesis refers that governorates of El Beheira, El Gharbiya and El Dakahlia are considered the most importantgovernorates which succedded in controlling the borer insects that attack potatoes.Finally, the thesis refers to the most important concerned problems and the most interesting recommendations & results which were issued in this respect :Interest in the integrated pest management control elements, as well as protection of cultivated crops and encouraging the existence of natural bioogical enemies.-Generalizing installation of Pheromone traps at the same time of inserting and releasing the parasites, predators and entomopathogens in crop and vegetable fields .-Interest in applying the scientific researches related to cotton cultivation, protection of natural biological enemies and activating their turn & effect through the reduction ofpesticides use.- Support of the settled parasitic and predaceoustypes, for some imported types, besides reducing and preventing the environmental pollution aiming at preserving the human & animal health in addition to the land protection through realizingthe vital balance of environment.The thesis highlighted the risks of the chemicalpesticides' use on agriculture, environment, soil and human & animal health-with the importance of using the alternatives such as the biological control which doesn't cause any risk, but for the time being farmers cannot avoid using the chemical pesticides upon occurring the direct/condensed infection of plant. So, it is recommended to rationalize using the chemical pesticides upon the critical infection only under integrated control programme including use of all types of control which the Egyptian Ministry of Agriculture started to implement at the end of eighty(s) utill a well qualified biological control centers for all pests be established aiming at replacing chemical pesticides and developing environmentally friendly methods of pest control .